Alberta Regional Consortia

*What do I need to know as a teacher in order to be able to teach the concept(s)?*

# +Potential Misunderstandings

| The Question: (Focusing on the Misconception) | The Follow Up Question that will challenge the assumption. | Background Info |
|---|---|---|
| When you multiply 2 numbers, the product is bigger. | ½ x 10 = ? | Misunderstanding: Students generalize this idea when they only see examples that have whole numbers for the multiplicand and multiplier, they only ever see answers that are bigger. Although only students in Grade 5 and higher are exposed to multiplication of decimals and fractions, students in lower grades can be exposed to simpler experiences with the idea. For example, "I have 10 cookies. I'm going to give ½ of them to my friend and keep ½ of them to myself." |
| When you divide 2 numbers, the quotient is smaller. | 20 ÷ 0.5 = ? | Misunderstanding: Students generalize this idea when they only see examples that have whole numbers for the dividend and divisor, they only ever see answers that are smaller. Although only students in Grade 5 and higher are exposed to division of decimals and fractions, students in lower grades can be exposed to simpler experiences with the idea. For example, "I have 3 cookies. I'm going to split each in half so I can give half a cookie to each person. How many people can I feed?" |

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| Division stops when you end up with a remainder.<br><br>Example 17÷ 4 = 4R1 | Case 1: If I need 17 kg of flour and I can buy 4 kg bags, how many bags do I need?<br><br>Case 2: I have 17 chocolate bars and am sharing between 4 people.<br>How much do we each get? | Case 1: Students need to understand that in certain situations, a remainder must interpreted appropriately. In this case, students must understand that they actually need 5 bags not 4 bags. Rounding up becomes necessary due to the context of the problem.<br><br>Case 2: Students need to understand that in certain situations, a remainder can be divided some more. In this case, students must understand that a piece of the chocolate bar can be given to each person. Therefore, they are actually received 4 ¼ chocolate bars. |
| The associative property is possible with all 4 operations. | 125 + (25 ÷ 5) equal to (125 + 25) ÷ 5 ?<br><br>Is 6 ÷ (4 ÷ 2) equal to (6 ÷ 4) ÷ 2? | Misunderstanding: Students learn thataddition is associative so it doesn't matter if you do 2 + (4 + 3) or (2 + 4) + 3 because you get the same answer. They may transfer this concept to questions with mixed operations. |
| The commutative property is possible with all 4 operations. | Is 72 ÷ 9 equal to 9 ÷ 72 ? | Misunderstanding: Students learn that multiplication is commutative so it doesn't matter if you do 2 x 4 or 4 x 2 because you get the same answer. They may transfer this concept to division. |
| All units work on base 10. | What is 3 ½ hours in minutes? | Time works on a different base. Therefore the answer is not 350 minutes. |
| For teacher knowledge only: Multiplicative Thinking is repeated addition. | 0.5 x 1.6 | Misunderstanding: "While repeated addition may be an appropriate beginning, to maintain that interpretation of multiplication is ultimately disabling because it does not provide children with important multiplicative structures. Multiplicative thinking cannot be generalised in any simple way from additive thinking. Unless teachers consciously help children develop multiplicative thinking, which goes well beyond repeated addition, it may not happen for many children." Source |